REMARKS

Claim rejections under 35 U.S.C. §112, first paragraph. Claims 2-66 and 80-83 are rejected on the grounds that they contain subject matter which is not described in the specification in such a way as to convey that Applicants had possession of the invention at the time the application was filed. The Examiner's specific grounds for rejection are set forth and responded to below.

In the response dated September 27, 2001, Applicants pointed out that these claims are not directed to "mutant cellulases," but to mutant *Chrysosporium* fungi (claim 83) and to cellulases derived therefrom (claims 2 and 4). The Examiner acknowledges this, yet proceeds to state in the very next sentence that "[c]laims 2, 4, and 83 are directed to all possible mutant cellulases obtained from the genus *Chrysosporium*." The Examiner then states that "[t]he specification only discloses a mutant cellulase from a mutant strain of C-1 (see Example 14)."

Applicants reiterate the facts that Example 14 describes the preparation of a mutant *Chrysosporium* fungus, not a mutant cellulase, and that the claims are directed to mutant fungi, not mutant cellulases. Applicants cannot see how this can be denied given the plain language of the specification and claims.

The Examiner states that "[t]here is no written description of any mutant fungus of the genus Chrysosporium." The specification, in example 14, page 70, provides a description of the method of making a mutant fungus of the genus *Chrysosporium*. This mutant was deposited on February 9, 1998 under the Budapest Treaty in the All-Russian Collection (VKM), Moscow, with number VKM F-3632 D. A copy of a viability statement obtained July 25, 2001 is enclosed. The specification has been amended to refer to the deposit. Where biological materials do not admit of ready written description, a deposit of the biological material will suffice to meet the requirements of 35 USC 112. A statement under 37 CFR 1.804(b) will be timely submitted.

The Examiner states that "[t]here is no disclosure of any particular structure to function/activity relationship in the mutant cellulase." Applicants once again point out that none of the claims are directed to a mutant cellulase. The structure of the enzyme itself is not believed to differ from that produced by the wild-type C1 strain; it is far more likely that production of the cellulase is deregulated in the mutant fungi.

The Examiner also states that the specification fails to describe additional representative species "by any identifying structural characteristics or properties for which predictability of structure is apparent." Applicants again point out that there is no structural characteristic that could be pointed out. The structures of the cellulases were not known at the time of filing, but this is not grounds for a written description rejection. Additional cellulase-producing mutants have been prepared (see PCT/NL99/00618), but there is no written description to distinguish one from another: the cellulase over-producing mutants all appear on the selection plates as colonies with a zone of cellulose clearing surrounding them. That is the one characteristic that defines the genus, and additional descriptions of identical-appearing mutants would not serve to improve the written description. The invention would not be described in more full, clear, concise, and exact terms by a recitation that ten or a hundred mutants, all having zones of cellulase clearing on selection plates, had been isolated.

Applicants respectfully reiterate that this disclosure would reasonably convey to one of skill in the art that Applicants had possession of the invention as claimed in claims 2, 4, and 83. One of skill in the art would recognize that *Chrysosporium* fungi are capable of producing the neutral and/or alkaline cellulases of the invention, regardless of whether the fungi are wild-type or mutant. There is believed to be no difference between cellulases produced by wild-type and mutant fungi -- to the best of Applicants' knowledge the mutants merely produce larger quantities of the same enzymes.

Applicants respectfully point out that because the phrase "wild-type or mutant" appeared in the claims, an unfortunate restriction requirement (between wild-type and mutant fungi) was made in the parent application. Applicants are merely seeking to reach the outcome that would have been reached if the original claims had simply recited "*Chrysosporium*" without the superfluous expression "wild type or mutant." The Examiner's position would permit an infringer to irradiate Chrysosporium spores, isolate any cellulase-producing mutant (a trivial task), and proceed to practice applicants' invention without infringing a single allowed claim.

The Examiner states that "[c]laims 24, 36, 46, and 52 are directed to all possible nucleic acid sequences form a wild-type or mutant fungus of the genus *Chrysosporium*." As Applicants have previously pointed out, the claims are in reality directed to enzyme compositions. The preamble to claim 24 reads, "A composition for the enzymatic treatment of

cellulosic fibers..." The claimed compositions are characterized by the presence of a cellulase that is encoded by a *Chrysosporium* gene, but the claims cannot be regarded as claims to nucleic acids. Claims 24, 36, 46, and 52 are directed to *Chrysosporium* enzymes. They are defined in the claims as enzymes "encoded by" *Chrysosporium* genes, in order to read upon the claimed enzyme even if a would-be infringer were to transfer the gene to another species. Contrary to the Examiner's interpretation, the genes themselves are not claimed. In view of these observations, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 24, 36, 46, and 52 on these grounds.

The Examiner contends that claims 80-82 are

> "directed toward all possible methods for generating mutant strains of the genus Chrysosporium. The specification, however, provides the following representative methods encompassed by the claim: exposure to UV radiation, nitrous acid, N-methyl-N'-nitro-N-nitrosoguanidine, or 4-nitroquinoline-N-oxide."

The Examiner states that the specification fails to describe additional methods. Applicants have previously pointed out that the specification also teaches oligonucleotide directed mutagenesis, linker scanning mutations, and directed mutagenesis with PCR. Reference to two well-known books on the topic are also provided. See page 18, lines 23-26. The Examiner fails to acknowledge these additional disclosures. Applicants respectfully submit that the specification provides more than enough methods to support a claim to the genus of mutation methods, as written. Furthermore, claim 80 is not "directed toward all possible methods for generating mutant strains of the genus *Chrysosporium*" but specifically recites additional culturing and screening steps that further limit the scope of the claim. Finally, claim 82 is directed to three methods of mutagenesis, all of which are taught in the specification, and Applicants fail to see how this claim can be rejected on the grounds of overbreadth. Reconsideration and withdrawal of the rejection of claims 81 and 82 is respectfully requested.

The Examiner rejects claims 2-66 on the grounds that the specification "does not reasonably provide enablement for any mutant cellulase from any mutant fungus of the genus *Chrysosporium*." The Examiner states that "The nature and breadth of the claims encompass any mutant cellulase from any mutant fungus of the genus *Chrysosporium*." Applicants again point

out that the claims are not directed to mutant cellulases, but are directed to cellulases from *Chrysosporium* where the *Chrysosporium* organism may (or may not) be a mutant.

The Examiner asserts that knowledge regarding the specific mutation in the amino acid sequence of the claimed cellulases is lacking, and that searching for the specific amino acid to mutate is outside the realm of routine experimentation. The Examiner goes on to state that "the amount of experimentation to determine the specific mutagenic method for making the claimed fungal strain is enormous," and recites such steps as isolating the cellulase, preparing DNA libraries, obtaining DNA sequences, mutating the DNA, and expressing the mutant DNA in host cells.

Applicants have previously conceded that the process described by the Examiner represents a great deal of work, but the specification and the plain language of claim 80 reveals that none of these steps are necessary to practice the invention. According to claim 80, only three steps are required: spores are mutated (simple exposure to radiation or chemicals are the exemplified embodiments), spores are cultured, and cultures are screened. The screening is done by visual inspection for cleared zones around colonies grown on cellulose agar plates (specification pp. 21-22, and especially example 14, p. 70). *The practice of the claimed invention does not involve isolation or sequencing of proteins or DNA.*

The Examiner "finds that one skilled in the art would require additional guidance, such as information regarding the specific mutation performed on the amino acid sequence of the claimed neutral and/or alkaline cellulase activity." Applicants respectfully repeat that such guidance is not necessary. *There are no specific mutations performed on the amino acid sequence of the claimed neutral and/or alkaline cellulase.* One skilled in the art, in order to practice the method of claim 80, needs only to choose a *Chrysosporium* species and then perform exactly the steps described in the specification: mutation of spores, culturing of spores, and assaying of cultures (p. 70, example 14). Any other mutagenic method may be employed, according to claim 80, and accordingly the practitioner may select any of the routine mutagenesis methods well-known in the art.

A similar situation arose in *Ex Parte Jackson*, where the Board of Patent Appeals and Interferences recognized the routine nature of traditional methods of mutagenesis:

> "Claims 3 to 5 have been finally rejected under the first paragraph of 35 U.S.C. 112 as being based on an insufficient disclosure of how to practice the invention claimed with respect to mutations of the recited microorganisms. It is very well known that spontaneous mutation is a common occurrence in microorganisms and that mutations can be intentionally produced by a variety of known procedures. Evidence of such knowledge in the prior art can be found in the patents cited in appellants' brief. Thus, we shall not affirm this rejection."

Ex parte Jackson, Theriault, Sinclair, Fager, and Karwowski, 217 USPQ 804 (BdPatApp&Int 1982)

CONCLUSION

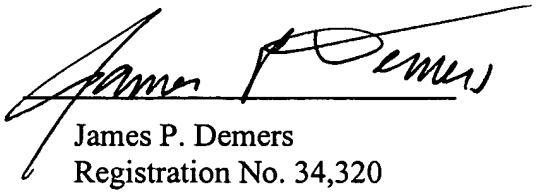
The Examiner appears to misapprehend the nature of the claimed invention and the simple means by which it is achieved. This is not a high technology invention. Mutation of fungal spores requires nothing more than appropriate culture media, an ultraviolet lamp, and a measure of patience. The practice of the invention involves no molecular biology whatsoever, and could be performed as a high school science project. Isolated enzymes are not needed, knowledge of their structures is not needed, and isolated DNA and knowledge of its sequence is not needed. The experiments are entirely routine.

Favorable consideration and an action passing this case to issue are respectfully requested. If any questions or issues remain, or if the Examiner has any comments or suggestions for expediting allowance of this application, he is invited to contact the undersigned at the telephone number below.

Respectfully submitted,

MORGAN & FINNEGAN, L.L.P.

Dated: June 14, 2002

By: 

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